

CLAIMS

What is claimed is:

1. An aircraft, comprising:

5 a volume adapted to contain a first, a second, and a third object;  
a primary air conditioning system adapted to compress and cool a  
first quantity of outside air, adapted to pressurize the volume therewith whereby  
the first quantity of outside air becomes a first quantity of inside air, and adapted  
to ventilate the first object with the first quantity of inside air;

10 an exhaust adapted to exhaust a portion of the inside air; and  
a cooler adapted to cool a coolant and further adapted to cool the  
second and third objects with the coolant.

2. The aircraft according to claim 1, the first object to be a passenger.

15 3. The aircraft according to claim 1, the second object to be selected  
from the group consisting of a cargo compartment, a piece of electronic  
equipment, and a galley refrigerator.

20 4. The aircraft according to claim 1, the coolant to be inside air.

5. The aircraft according to claim 1, the coolant to be selected from  
the group consisting of polyalphaolefin, propylene glycol, and water.

6. The aircraft according claim 1, the primary air conditioning system further comprising an air cycle system and a turbine expander.

7. An aircraft, comprising:
- an internal volume adapted to contain a plurality of heat loads;
  - a compressor adapted to compress outside air;
  - a cooler adapted to cool the compressed outside air whereby the cooled compressed outside air becomes inside air, the inside air to pressurize the volume;
  - a centralized thermal management system, the thermal management system adapted to provide a fluid to the plurality of heat loads, whereby the heat loads will be temperature controlled by the fluid.

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8. The aircraft according to claim 7, the volume further adapted to contain a passenger, the inside air to at least ventilate the passenger.

9. The aircraft according to claim 7, the plurality of heat loads to include one of a piece of cargo, a piece of electronic equipment, and a galley refrigerator.

10. The aircraft according to claim 7, the fluid to be inside air.

20 11. The aircraft according to claim 7, the fluid to be selected from the group consisting of polyalphaolefin, propylene glycol, and water.

12. The aircraft according to claim 1, the cooler further comprising an air cycle system and a turbine expander.

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13. A method of managing thermal loads on an aircraft comprising:  
compressing a first quantity of outside air;  
cooling the first quantity of outside air to form a quantity of inside  
air;

5                   exhausting a portion of the inside air;  
                      ventilating a first object in a pressurized volume of the aircraft with  
the quantity of inside air;  
                      cooling a fluid;

10                cooling a second object in the pressurized volume with the fluid;  
and  
                     saving energy by allowing a second quantity of outside air to remain  
outside air.

14. The method according to claim 13, the first object to be a  
15 passenger.

16. The method according to claim 13, the second object to be selected  
from the group consisting of a cargo compartment, a piece of electronic  
equipment, and a galley refrigerator.

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17. The method according to claim 13, the fluid to be inside air.

18. The method according to claim 13, the fluid to be selected from the  
group consisting of polyalphaolefin, propylene glycol, and water.

18. The method according to claim 13, the cooling of the first quantity of outside air to further comprise:

using ram air to cool the first quantity of outside air; and  
expanding the first quantity of outside air.

19. A method of designing an aircraft air conditioning system comprising:

including an outside air supply and a supplemental cooling unit in an architecture of the aircraft air conditioning system, the outside air supply to  
5 compress outside air to pressurize an interior of the aircraft with inside air, the inside air to ventilate at least a portion of the pressurized volume, the supplemental cooling unit to control the temperature of an object in the pressurized interior of the aircraft; and

sizing the outside air supply based on the including of the supplemental  
10 cooling unit in the aircraft air conditioning system architecture.

20. The method according to claim 19, further comprising including an inside air recirculation line to the supplemental cooling unit whereby the supplemental cooling unit to control the temperature of the object in the  
15 pressurized volume with the recirculation air.

21. The method according to claim 19, further comprising including a central coolant loop to the supplemental cooling unit whereby the supplemental cooling unit to control the temperature of the object in the pressurized volume  
20 with a coolant of the central coolant loop.